

Ultra-low Noise, High Bandwidth, 1550nm HgCdTe APD, Phase I

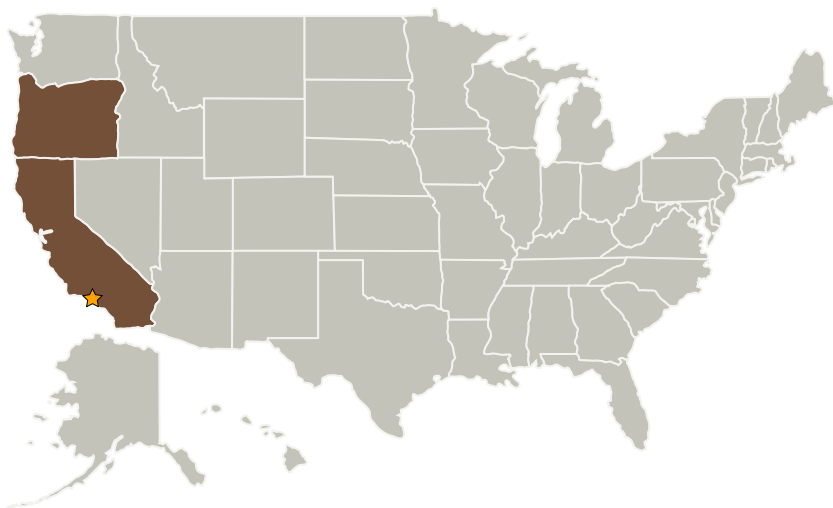
Completed Technology Project (2004 - 2004)



Project Introduction

Voxtel Inc. proposes to optimize the design of a large area, 1.55 μ m sensitive HgCdTe avalanche photodiode (APD) that achieves high gain with nearly no excess noise. By optimizing the APD device structure and by exploiting the most recent insight into the material's ionization characteristics, we have engineered the vertical HgCdTe APD for nearly noiseless gain (ultra low k) with high bandwidth and with low dark current. As large area photodetectors necessarily have high dark current and increased capacitance, we will tradeoff the performance of a large area detector design with that of a pixilated design. A pixilated detector can reduce the amplifier noise and dark current in the local of the amplified events to sufficiently low levels for photon counting. Through the use of our low noise, high unit cell density, amplifier integrated circuits, we will demonstrate nearly ideal receiver performance for space optical communications applications.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Voxtel, Inc.	Supporting Organization	Industry	Beaverton, Oregon



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

California

Oregon

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

James P Gates

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes